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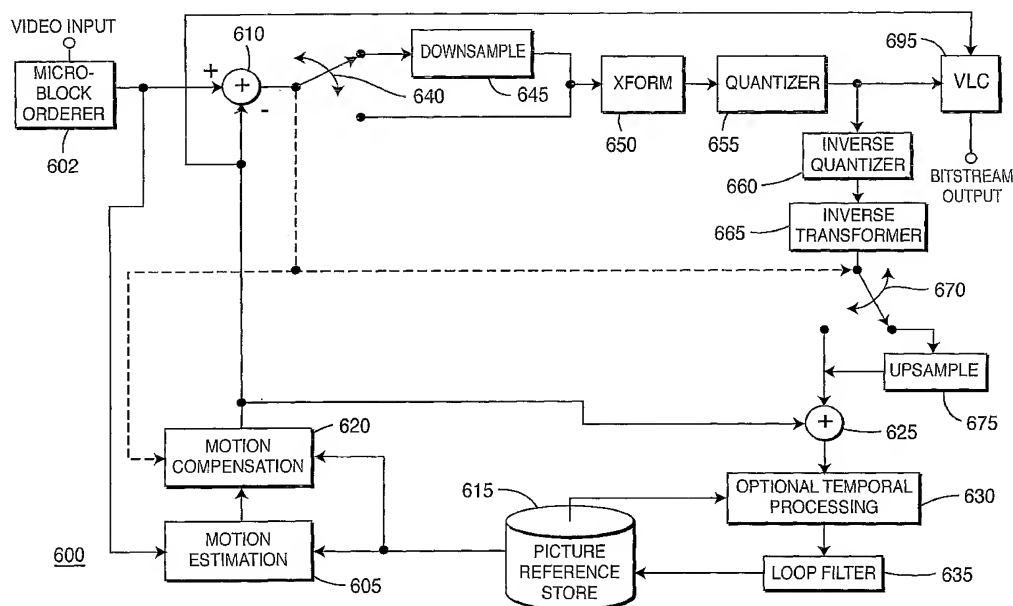
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[Continued on next page]

(54) Title: REDUCED RESOLUTION UPDATE MODE FOR ADVANCED VIDEO CODING



(57) Abstract: There is provided a video encoder, video decoder and corresponding encoding and decoding methods for respectively encoding and decoding video signal data for an image slice. The video encoder includes a slice prediction residual downsampler (645) for downsampling a prediction residual of at least a portion of the image slice prior to transformation and quantization of the prediction residual. The video decoder includes a prediction residual upsampler (715) for upsampling a prediction residual of the image slice.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/006453

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/26 H04N7/50 H04N7/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>"Recommendation H.263: Video coding for low bit rate communication" ITU-T DRAFT RECOMMENDATION H.263, February 1998 (1998-02), pages 1-167, XP002176560 cited in the application</p> <p>page 4, paragraph 3.4.9 page 9 - page 13, paragraph 4.2 page 23 - page 27, paragraphs 5.1.3, 5.1.4 page 85 - page 88, paragraphs K.1, K.2 page 129 - page 142, paragraphs Q.1-Q.7.2 Figure 3/H.263 figure Q.1/H.263</p> <p>----- -/--</p>	<p>1-3, 5-8, 12, 13, 15, 17-20, 23-25, 27-30, 32, 34, 35, 37, 39-42</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

24 May 2005

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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"TEXT OF FINAL COMMITTEE DRAFT OF JOINT VIDEO SPECIFICATION (ITU-T REC. H.264 / ISO/IEC 14496-10 AVC)" INTERNATIONAL ORGANIZATION FOR STANDARDIZATION - ORGANISATION INTERNATIONALE DE NORMALISATION, July 2002 (2002-07), pages I-XV,1, XP001100641 cited in the application page 9, paragraph 6.2 page 11 - page 12, paragraph 6.4 figures 6-5,6-6 page 67 - page 72, paragraph 8.5 page 136 - page 141, paragraph 12.4.1 page 33 - page 34, paragraph 7.4.2.2</p>	<p>1-3,5-8, 12,13, 15, 17-20, 23-25, 27-30, 32,34, 35,37, 39-42</p>
A	<p>US 5 262 854 A (NG ET AL) 16 November 1993 (1993-11-16)</p> <p>the whole document</p>	<p>1-3,5-8, 12,13, 15, 17-20, 23-25, 27-30, 32,34, 35,37, 39-42</p>
A	<p>WO 95/15538 A (POLAROID CORPORATION) 8 June 1995 (1995-06-08)</p> <p>page 11, line 27 - page 23, line 16</p>	<p>1-3,5-8, 12,13, 15, 17-20, 23-25, 27-30, 32,34, 35,37, 39-42</p>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/006453

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 5-8, 12, 13, 15, 17-20, 23-25, 27-30, 32, 34, 35, 37, 39-42

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3,5-8,12,13,15,17-20,23-25,27-30,32,34,35,37,39-42

Video encoder with prediction residual downsampling before transform and quantization.

- 1.1. claims: 1,2,5-7,12,13,17-19,23,24,27-30,32,34,35,39-42

Video encoder with prediction residual downsampling before transform and quantization compliant with ITU-T H.264 standard.

- 1.2. claims: 1,3,8,12,15,20,23,25,34,37

Video encoder with prediction residual downsampling before transform and quantization with downsampling operation depending on direction.

2. claims: 1,4,9,10-12,14,16,21-23,26,31,33,34,36,38,43

Video encoder with prediction residual downsampling before transform and quantization with downsampling operation performed in units of slices.

INTERNATIONAL SEARCH REPORT

Information on patent family members

national Application No

PCT/US2005/006453

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